

TASK: Obstacle Avoidance with 2d-Lidar

Domain: ROS/Robotics

Naidu Sai Vinay

Task CheckPoints:

- To successfully avoid any type of obstacle that we may encounter within radius of 2 meters
- To get number of obstacles
- To get distances between Obstacles
- To get start and end angles of Obstacles

1. Algorithm for Obstacle Avoidance:

- Subscribed to laser topic and get data from **ranges**
- Divide 720 samples to 3 regions[center, right,left(240 each)]
- Add them into separate arrays.
- Create a function for getting values less than 2 meters in each region(center,left,right)
- Then, create a check function to see if there are obstacles in which areas and correspondingly publish the twist_messages to **cmd_vel topic** and update a status message

2. Algorithm To get number of obstacles and distance between obstcales:

- Lidar range maximum is 5 meters so use if condition if there is any values in ranges that are less than 5 and if yes make the flag true for that region
- If all regions are yes then 3 obstacles and accordingly get the number of obstacles. Note: For more accuracy we have to increase regions
- Also get the values from arrays where obstacle is detected and add them in array for publishing

3. Algorithms for Getting start and end angles:

- According to the gazebo plugin the angle increment is 0.0043 for each sample that means each value in the array is represented by the corresponding angle.
- So when the first obstacle is detected the let the index value of the array value is i then
 - Center region: $((i+240)*0.0043)*180/1.57;$
 - Right Region: $((i)*0.0043)*180/1.57;$
 - Left Region: $((i+480)*0.0043)*180/1.57;$
- These formulas can be used to get start and end angles

Github link:

<https://github.com/saivinay1311/2D-Lidar-Obstacle-Avoider.git>

(Contains : Code File, Working Video, Report)